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Serial No.: 09/560,268

Confirmation No.: 2517

Filed: 26 April 2000

For: COMPOSITION FOR SELECTIVELY ETCHING AGAINST COBALT SILICIDE (As Amended)

traverse this rejection and submit that claims 64-93 are not *prima facie* obvious in view of the cited references for at least the following reasons.

The Tsai et al. Document

Applicants respectfully submit that Tsai et al. does not render the pending claims of the present invention *prima facie* obvious for at least the following reasons.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all the claim limitations. *See* M.P.E.P. § 2143.

Applicants submit that the claims of the present invention are not *prima facie* obvious in light of Tsai et al. because Tsai et al. does not teach or suggest all of the claim elements. For example, Tsai et al. does not teach or suggest a composition that is within the ranges recited in the claims of the present invention. Further, Tsai et al. does not teach or suggest the etch rates that are recited in claims, e.g., new claim 68.

Regarding the recited chemical composition, claim 64, for example, recites an etching composition including a mineral acid, a peroxide, and deionized water at a ratio in a range of about 1:1:35 to about 1:1:5. The present invention utilizes the following commercially available concentrations of mineral acids: HCl is 37% by weight in deionized water; HNO₃ is 70% by weight in deionized water; H₂SO₄ is 96% by weight in deionized water; H₃PO₄ is 85% by weight in deionized water; and HF is 49% by weight in deionized water. *See* Specification, page 9, lines 20-27. Suitable peroxides include hydrogen peroxide, which is utilized in the present invention at a commercially available concentration of 29% by weight in deionized water. *See id.* at page 10, lines 4-6. Therefore, the ratios recited in, e.g., claim 64 refer to ratios of commercially available concentrations of the respective compositions. For example, a ratio of 1:1:35 (mineral

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acid:peroxide:deionized water) includes a ratio of 1 part 37% by weight HCl, 1 part 29% by weight hydrogen peroxide, and 35 parts deionized water (e.g., as recited by claim 65).

In contrast, Tsai et al. teaches chemical compositions that utilize a 90% by volume commercially available concentration of hydrogen peroxide. Clearly, because Tsai et al. teaches compositions having a 90% by weight concentration of hydrogen peroxide as compared to a 29% by weight concentration as recited in the claims of the present invention, Tsai et al. does not teach or suggest the same elements as those recited in the present invention.

For example, claim 65 of the present invention recites that the mineral acid of claim 64 is HCl and the peroxide is hydrogen peroxide; therefore, claim 65 recites an etching composition that includes 1 part 37% by weight HCl and 1 part 29% by weight hydrogen peroxide. Tsai et al., on the other hand, recites a mixture containing 1 part 38% by volume HCl and 1 part 90% by volume hydrogen peroxide. Clearly, a 1:1 ratio of 37% HCl to 29% hydrogen peroxide (i.e., claim 65) is considerably different than a 1:1 ratio of 38% HCl to 90% hydrogen peroxide (i.e., Tsai et al.).

Further, Tsai et al. does not teach or suggest any etch rates for the disclosed compositions. Instead of etching, Tsai et al. is concerned with cleaning the surface of a partially manufactured integrated circuit.

However, even though Tsai et al. does not teach or suggest etch rates, the Examiner alleged that the composition taught by Tsai et al. would inherently have the same etch rates as the claimed invention because it contains the same chemicals and with the same ratio as that of the claimed invention. Applicants traverse this allegation.

As mentioned above, the chemical compositions taught by Tsai et al. are not the same as those claimed in the present invention. If the prior art teaches the identical structure, then and only then are properties applicant claims necessarily present. *See In re Spada*, 911 F.2d 705, 709, 15 U.S.P.Q.2d 1655, 1658 (Fed. Cir. 1999). Because Tsai et al. teaches concentrations of hydrogen peroxide that are different than those recited in the present invention, the chemical compositions taught by Tsai et al. are not identical in structure to those recited in the present claims. The concentrations of components of a composition are clearly part of the structure. In

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this case, the concentrations of Tsai et al. and the present invention are different. Therefore, Tsai et al. does not inherently teach the etch rates claimed in the present invention.

Further, Applicants are not asserting that all claimed ratios of etch compositions exhibit the claimed etch rates. On the contrary, the claims are directed only to those etch compositions that have the desired etch rates. The etch compositions claimed and which have a desired etch rate are a subset of the claimed ratios for the etch composition. Tsai et al., on the other hand, does not teach the entire range of ratios that are claimed in the present invention, and Tsai et al. is silent regarding etch rates. Therefore, it is not necessarily inherent that Tsai et al. teaches the claimed etch rates, e.g., chemical compositions not taught in Tsai et al. may possess the desired etch rates as recited in the claims of the present invention.

In addition, the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. See M.P.E.P. § 2112. "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" *In re Robertson*, 169 F.3d 743, 745, 49 U.S.P.Q.2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted). Here, Tsai et al. does not teach or suggest etch rates at all. Such compositions in Tsai et al. may or may not have etch rates that fall within the ranges claimed. Further, the claimed etch rates are not necessarily present in the compositions of Tsai et al. As such, inherency cannot be established based on Tsai et al.

Response to Arguments

In the Response to Arguments section of the final Office Action dated 4 February 2002, the Examiner alleged that the features upon which Applicants rely are not recited in the rejected claims. Applicants traverse this allegation.

Applicants submit that the claims of the present invention, when read in view of the specification, recite elements that are not taught or suggested by Tsai et al. The specification can

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be used in interpreting claim language when the specification provides definitions for terms appearing in the claims. See M.P.E.P. § 2111.01 (citing *In re Vogel*, 422 F.2d 438, 441, 164 U.S.P.Q. 619, 622 (C.C.P.A. 1970)). Here, the Specification clearly provides definitions for terms that appear in the claims.

For example, claim 64 recites that the etching composition includes a mineral acid, a peroxide, and deionized water at a ratio in a range of about 1:1:35 (mineral acid:peroxide:deionized water) to about 1:1:5 (mineral acid:peroxide:deionized water). As clearly defined in the Specification, "[c]oncentrations of solutions described herein are given based on the commercially available solutions. For example, if the solution has a concentration of 30% HCl, then the solution includes 30% by weight of the commercially available HCl solution." Specification, page 9, line 29 through page 10, line 3. The concentrated solutions of mineral acids and the peroxide (i.e., the commercially available solutions of mineral acids and the peroxide) "are diluted by volume in deionized water in the desired proportion." Specification, page 10, lines 7-8. In other words, the commercially available solutions as set forth in the Specification are combined and diluted with deionized water in the desired proportion. Therefore, the etching composition recited in claim 64, which includes a mineral acid, a peroxide, and deionized water at a ratio in a range of about 1:1:35 to about 1:1:5, is an etching composition that includes the commercially available solution of a mineral acid, the commercially available solution of a peroxide, and deionized water at a ratio in a range of about 1:1:35 to about 1:1:5, i.e., the ratios claimed are for commercially available solutions, not the undiluted form of each respective composition.

Further, for example, claim 65 recites that the etching composition of claim 64 includes HCl as the mineral acid and hydrogen peroxide as the peroxide. According to the Specification, the commercially available concentrated solution of HCl used in the present invention is a 37% solution of HCl. See Specification, page 9, line 25. The commercially available concentrated solution of hydrogen peroxide utilized by the present invention is a 29% solution of hydrogen peroxide. Therefore, claim 65 recites an etching composition that includes a 37% by weight solution of HCl, a 29% by weight solution of hydrogen peroxide, and deionized water at a ratio

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in a range of about 1:1:35 to about 1:1:5. In other words, claim 65 does not recite an etching composition of 1 part 100% HCl, 1 part 100% hydrogen peroxide, and 35 parts deionized water, as is alleged by the Examiner.

Tsai et al. also utilizes commercially available solutions in the compositions taught. As stated by Tsai et al., "[t]he compositions referred to below are thus in parts by volume of the strongest commercially available solutions, whose concentrations are as follows: HF 70%, H₂O₂ 90%, NH₄OH 30%, and HCl 38%." For example, Tsai et al. teaches a composition containing 1 part of hydrochloric acid (HCl), 1 part of H₂O₂, and 6 to 10 parts water. *See* Tsai et al., column 4, lines 6-8. In other words, this composition contains 1 part of a 38% by volume solution of HCl, 1 part of a 90% by volume solution of H₂O₂, and 6 to 10 parts water.

Yet further, the Examiner alleged that, because the recited chemicals are diluted with water to have a final concentration in a ratio of 1:1:35-1:1:5, any commercially available concentration of these chemicals can be used and will be diluted to have a final concentration or ratio as above. Applicants again traverse this allegation.

As stated above, the ratios claimed by the present invention are for commercially available solutions, i.e., the ratios are not for the undiluted forms of the various solutions. Similarly, Tsai et al. teaches ratios that are for commercially available solutions as defined by Tsai et al. Because Tsai et al. relies upon different concentrations of commercially available solutions than the present invention, the ratios taught by Tsai et al. must be converted to include the same concentrations recited by the present invention in order to accurately compare Tsai et al. with the present invention. When the commercially available solutions as clearly defined by the present invention are used with the ratios of Tsai et al., the present invention recites compositions that are not taught by Tsai et al.

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It is respectfully submitted that the pending claims are in condition for allowance and notification to that effect is respectfully requested. The Examiner is invited to contact Applicants' Representatives, at the below-listed telephone number, if it is believed that prosecution of this application may be assisted thereby.

Respectfully submitted for
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CERTIFICATE UNDER 37 C.F.R. § 1.8:

The undersigned hereby certifies that this paper is being transmitted by facsimile in accordance with 37 C.F.R. § 1.6(d) to the Patent and Trademark Office, addressed to Assistant Commissioner for Patents, Washington, D.C. 20231, on this 4th day of April, 2002, at 11:10 (Central Time).

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